Cal OES

GOVERNOR'S OFFICE
OF EMERGENCY SERVICES

California Earthquake Early Warning Advisory Board Meeting

May 6, 2026

Roll Call

- Secretary of Business, Consumer Services, and Housing
- Secretary of Natural Resources Agency
- Secretary of California Health and Human Services
- Speaker of the Assembly Appointee representing the Interests of Private Businesses
- Senate Committee on Rules Appointee representing County Government
- Governor's Appointee representing the Utilities Industry
- Secretary of Transportation
- Chancellor of the California State University
- President of the University of California

Opening Comments

Review of Minutes

June 25, 2025

Recent Events

Phillip Labra, System Operations Manager
Todd Becker, Tsunami Program Specialist

M 8.8 – Kamchatka Peninsula, Russia

Todd Becker

Tsunami Program Specialist

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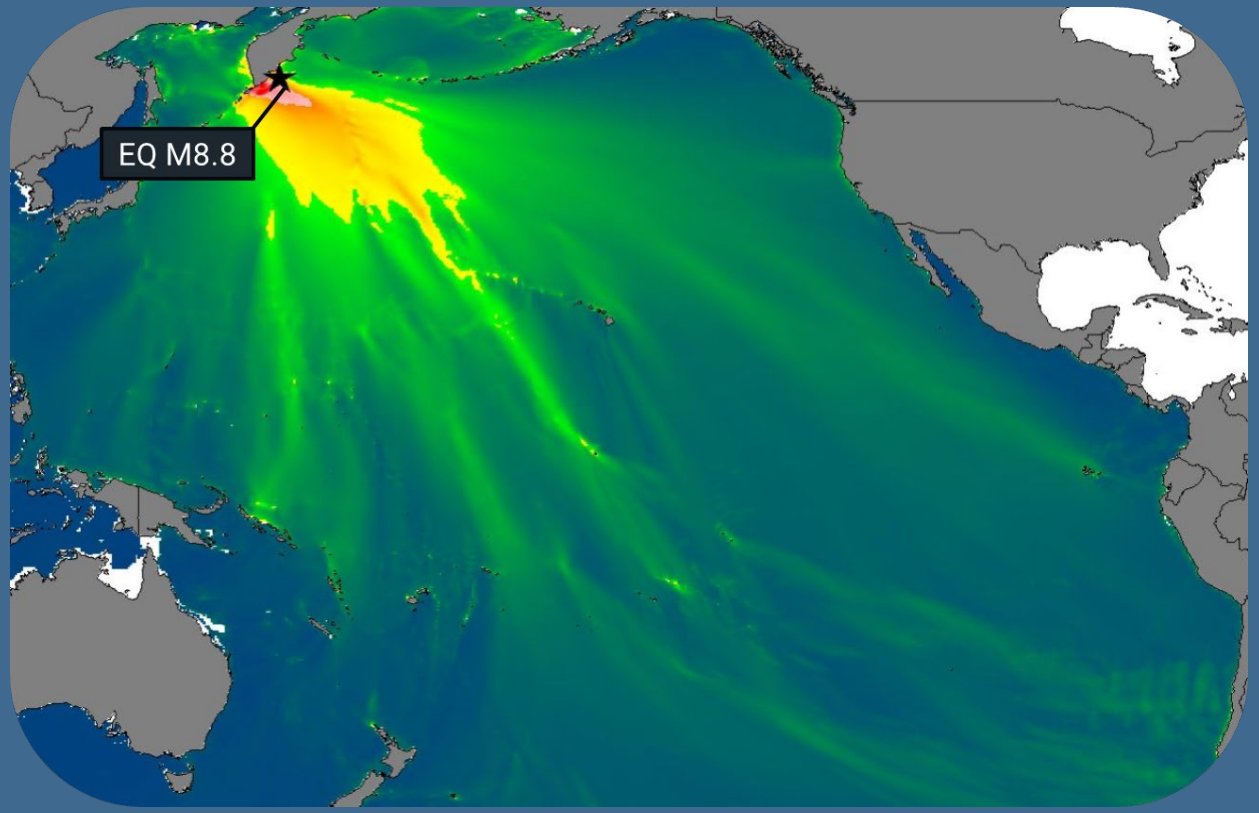
Kamchatka Tsunami Event Overview

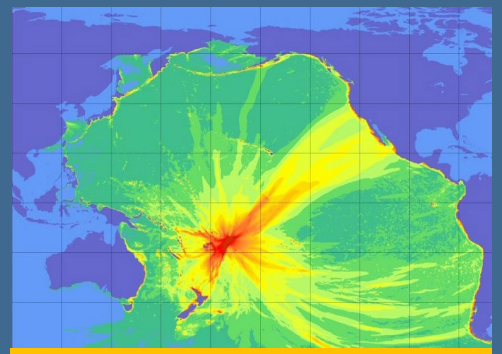
CA Earthquake Early Warning Advisory Board

May 6, 2026



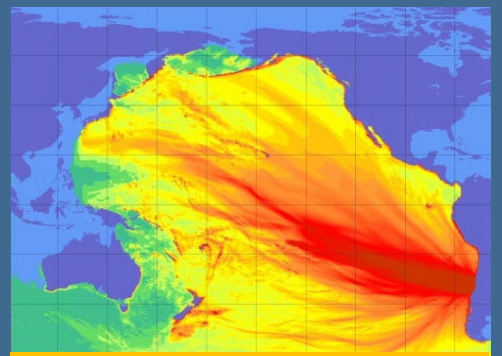
Tsunami Alerts in CA in the Last 16 Years

Samoa - Sept 2009



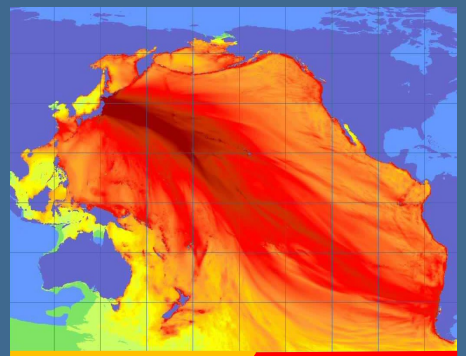
ADVISORY

Chile - Feb 2010



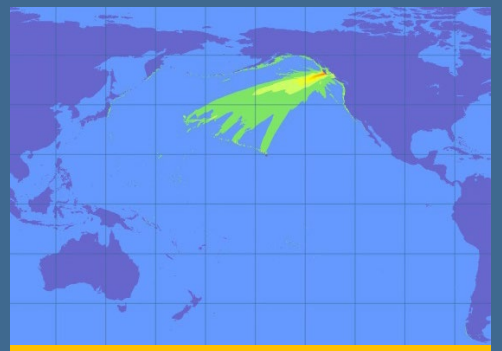
ADVISORY

Japan - March 2011



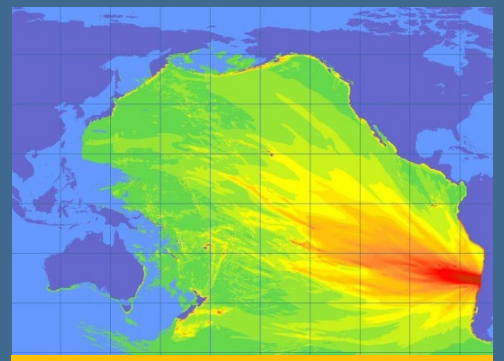
ADVISORY WARNING

BC Canada - Oct 2012



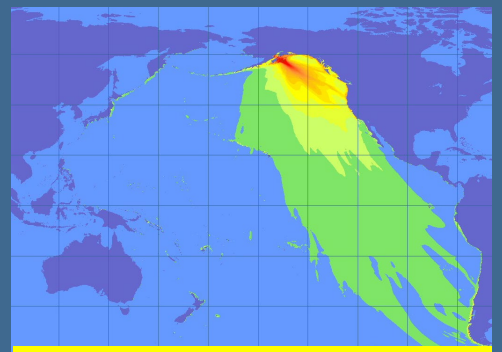
ADVISORY

Chile - Sept 2015



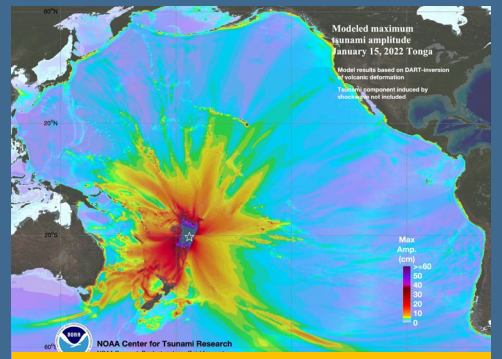
ADVISORY

Alaska - Jan 2018



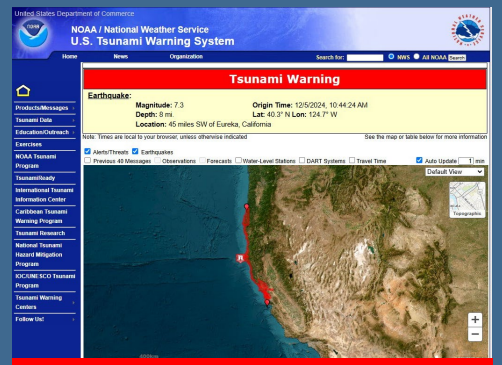
WATCH

Tonga - Jan 2022



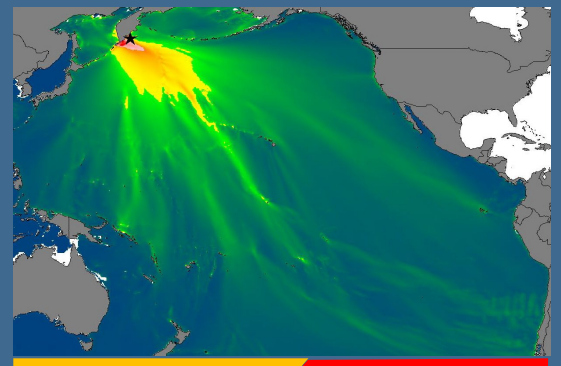
ADVISORY

NorCal - Dec 2024



WARNING

Kamchatka - July 2025

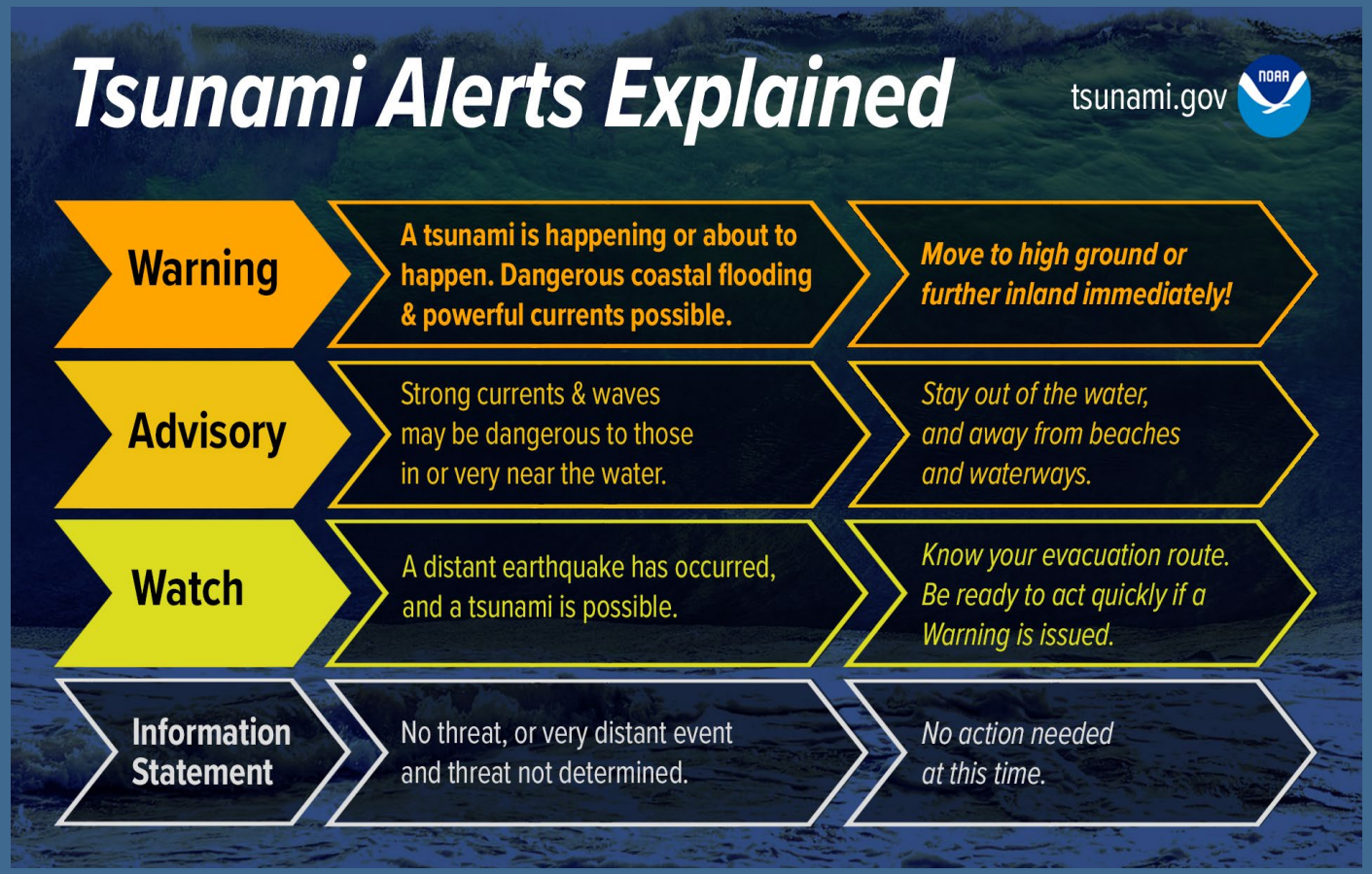


ADVISORY WARNING

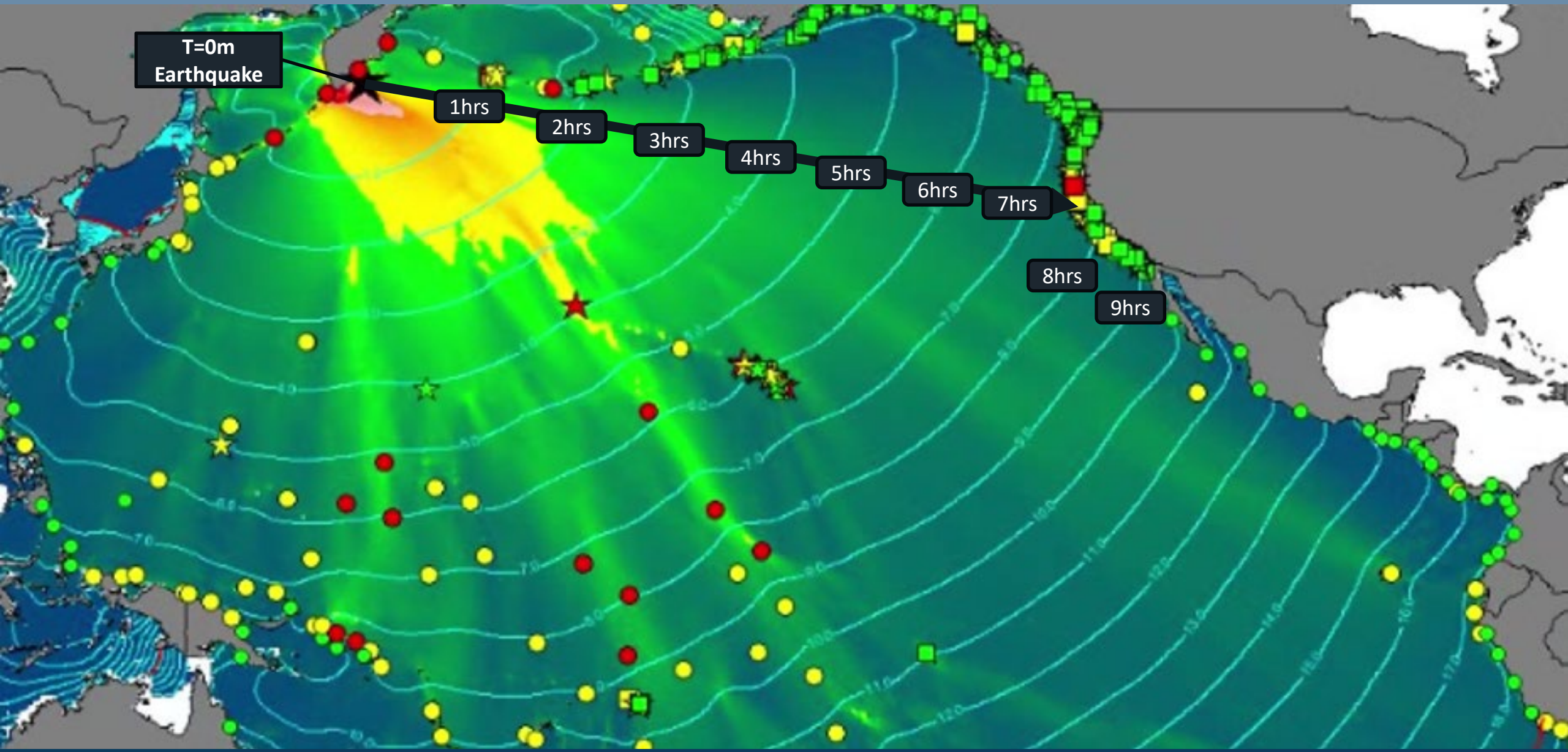
Kamchatka EQ and Tsunami Event Recap

July 29th, 2025

- 4:25 PM PT: M8.0 earthquake off the coast of Kamchatka, Russia. **The Tsunami threat for CA under evaluation**
- 5:19 PM PT: Magnitude revised to M8.7. **Tsunami Watch for CA**
- 6:27 PM PT: **Tsunami Advisory for all CA.**
- 8:27 PM PT: **Tsunami Warning for parts of CA.**



Tsunami Travel Timeline



NTWC Bulletin #1- Tsunami Danger Being Evaluated

```
BULLETIN
Public Tsunami Message Number 1
NWS National Tsunami Warning Center Palmer AK
435 PM PDT Tue Jul 29 2025

...A TSUNAMI ADVISORY IS NOW IN EFFECT...



Tsunami Advisory in Effect for;

 * ALEUTIAN ISLANDS, Samalga Pass, Alaska (30 miles SW of
   Nikolski) to Attu, Alaska including the Pribilof Islands


For other US and Canadian Pacific coasts in North America,
the level of tsunami danger is being evaluated.  Further
information will be provided in supplementary messages.


PRELIMINARY EARTHQUAKE PARAMETERS
---------------------------------

 * The following parameters are based on a rapid preliminary
   assessment of the earthquake and changes may occur.

 * Magnitude      8.0
 * Origin Time    1525 AKDT Jul 29 2025
                  1625  PDT Jul 29 2025
                  2325  UTC Jul 29 2025
 * Coordinates    52.2 North 160.0 East
 * Depth          46 miles
 * Location       315 miles SW of Bering I., Komandorski
                  80 miles SE of Petropavlovsk, Kamchatka
```

NTWC Bulletin #2 – Tsunami Watch

```
FORECASTS OF TSUNAMI ACTIVITY
-----------------------------
 * Tsunami activity is forecasted to start at the following
   locations at the specified times.
```

```
  * California
 Fort Bragg        2350  PDT Jul 29
 Crescent City     2355  PDT Jul 29
 Monterey          0015  PDT Jul 30
 Port San Luis     0035  PDT Jul 30
 San Francisco     0040  PDT Jul 30
 Santa Barbara     0050  PDT Jul 30
 Los Angeles Harb  0105  PDT Jul 30
 Newport Beach     0110  PDT Jul 30
 Oceanside         0115  PDT Jul 30
 La Jolla          0115  PDT Jul 30
```

```
BULLETIN
Public Tsunami Message Number 2
NWS National Tsunami Warning Center Palmer AK
519 PM PDT Tue Jul 29 2025

UPDATES
-------
 * A tsunami has been confirmed and some impacts are expected
 * Revised alert areas
 * Revised magnitude

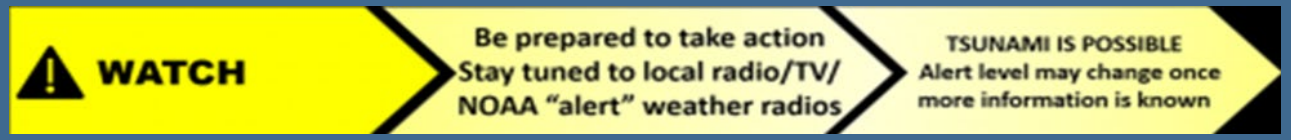

...A TSUNAMI WARNING IS NOW IN EFFECT...


...THE TSUNAMI ADVISORY REMAINS IN EFFECT...


...A TSUNAMI WATCH IS NOW IN EFFECT...
```

```
Tsunami Watch in Effect for;

 * CALIFORNIA, The coast from The Cal./Mexico Border to The
   Oregon/Cal. Border including San Francisco Bay
```



NTWC Bulletin #3 – Tsunami Advisory

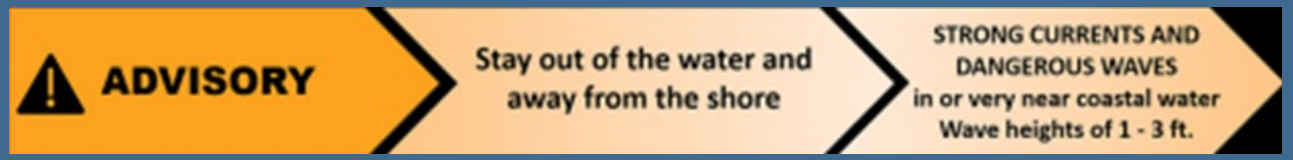
SITE	FORECAST START OF TSUNAMI	FORECAST TSUNAMI DURATION	FORECAST MAX TSUNAMI HEIGHT
* California			
Fort Bragg	2350 PDT Jul 29	9 hrs	0.8- 1.5 ft
Crescent City	2355 PDT Jul 29	36 hrs	3.1- 5.7 ft
Monterey	0015 PDT Jul 30		less than 1ft
Port San Luis	0035 PDT Jul 30	20 hrs	1.7- 3.2 ft
San Francisco	0040 PDT Jul 30		less than 1ft
Santa Barbara	0050 PDT Jul 30	9 hrs	0.9- 1.7 ft
Los Angeles Harb	0105 PDT Jul 30		less than 1ft
Newport Beach	0110 PDT Jul 30		less than 1ft
Oceanside	0115 PDT Jul 30		less than 1ft
La Jolla	0115 PDT Jul 30		less than 1ft

BULLETIN
Public Tsunami Message Number 3
NWS National Tsunami Warning Center Palmer AK
627 PM PDT Tue Jul 29 2025

UPDATES
---
* Revised alert areas
* Revised forecast information

...THE TSUNAMI WARNING REMAINS IN EFFECT...

...THE TSUNAMI ADVISORY REMAINS IN EFFECT...

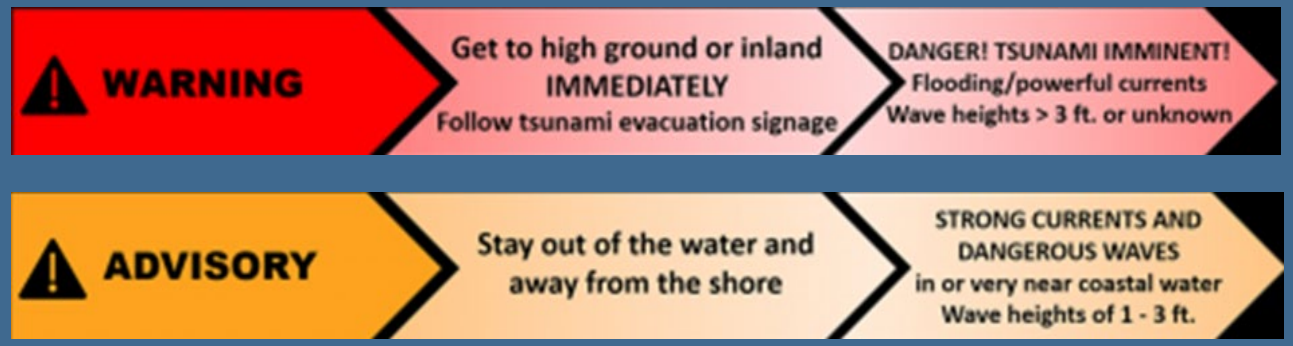


Tsunami Advisory in Effect for;

* CALIFORNIA, The coast from The Cal./Mexico Border to The Oregon/Cal. Border including San Francisco Bay

NTWC Bulletin #5 – Tsunami Advisory and Tsunami Warning

SITE	FORECAST START OF TSUNAMI	FORECAST TSUNAMI DURATION	FORECAST MAX TSUNAMI HEIGHT
* California			
Fort Bragg	2350 PDT Jul 29	9 hrs	0.7- 1.3 ft
Crescent City	2350 PDT Jul 29	30 hrs	2.6- 4.8 ft
Monterey	0015 PDT Jul 30		less than 1ft
Port San Luis	0035 PDT Jul 30	24 hrs	2.0- 3.7 ft
San Francisco	0040 PDT Jul 30		less than 1ft
Santa Barbara	0045 PDT Jul 30		less than 1ft
Los Angeles Harb	0100 PDT Jul 30		less than 1ft
Newport Beach	0110 PDT Jul 30		less than 1ft
La Jolla	0110 PDT Jul 30		less than 1ft
Oceanside	0115 PDT Jul 30		less than 1ft



BULLETIN
Public Tsunami Message Number 5
NWS National Tsunami Warning Center Palmer AK
827 PM PDT Tue Jul 29 2025

UPDATES
---
* Revised alert areas

...THE TSUNAMI WARNING REMAINS IN EFFECT...

...THE TSUNAMI ADVISORY REMAINS IN EFFECT...

Tsunami Warning in Effect for;

* CALIFORNIA, The coast from Cape Mendocino, California to The Oregon/Cal. Border

Tsunami Advisory in Effect for;

* CALIFORNIA, The coast from The Cal./Mexico Border to Cape Mendocino, California including San Francisco Bay

NTWC Tsunami Alert Cancelations

- **NTWC Bulletins #14 through #35**

```
BULLETIN
Public Tsunami Message Number 35
NWS National Tsunami Warning Center Palmer AK
717 AM PDT Thu Jul 31 2025

...THE TSUNAMI ADVISORY IS CANCELLED...

 * The Tsunami Advisory is canceled for the coastal areas of
   California
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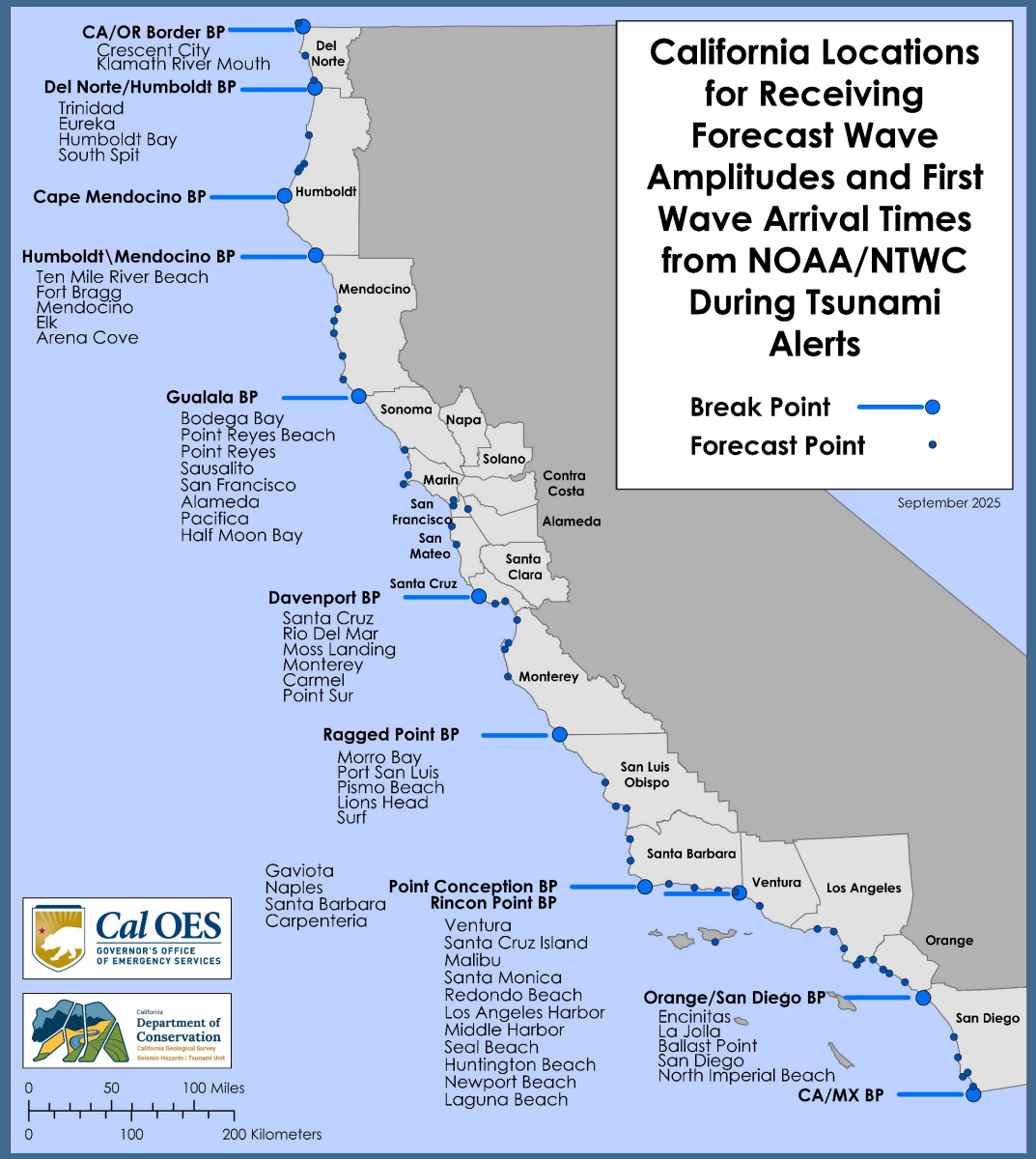
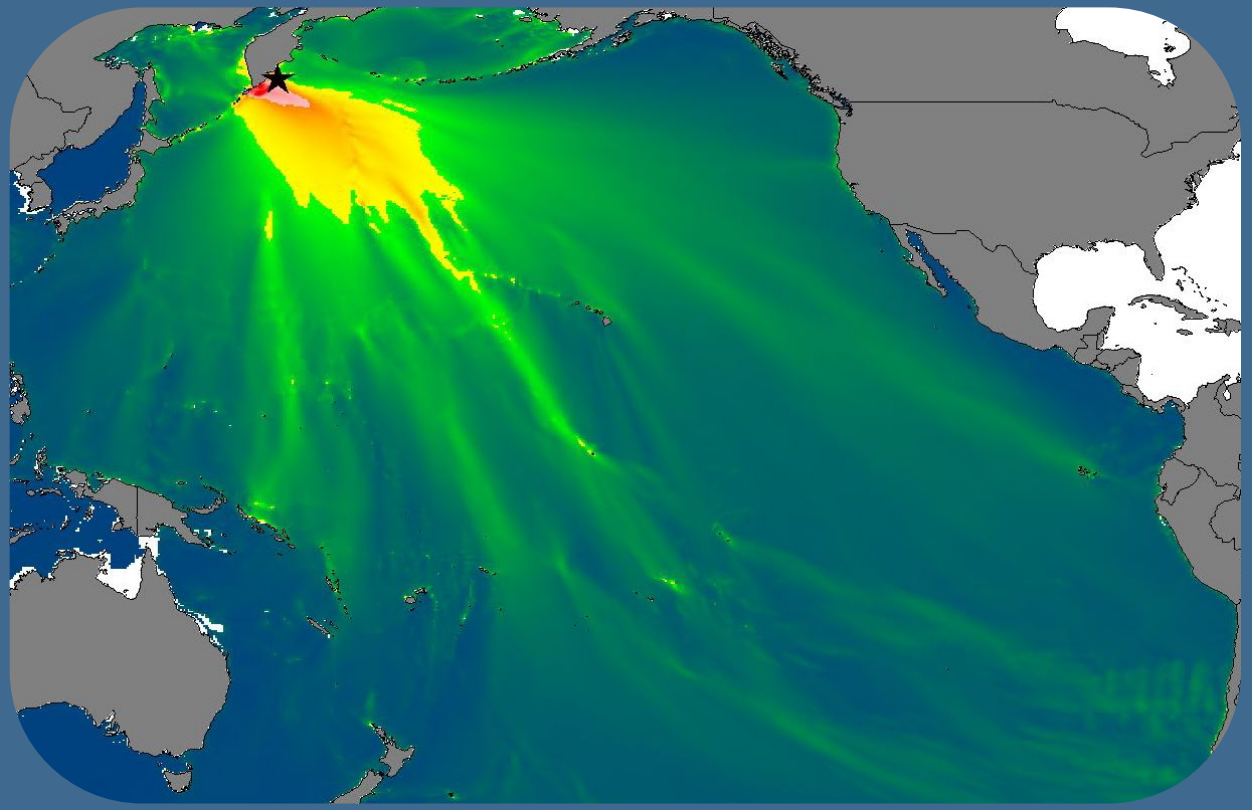
```
RECOMMENDED ACTIONS - UPDATED
-----------------------------
 * Do not re-occupy hazard zones until local emergency officials
   indicate it is safe to do so.
```



Tsunami Response - July 29-31, 2025

- 39 hours of response activities
- 35 NTWC Bulletins
- 23 NTWC Conference Calls
- 20 CA State Coordination Calls
- <u>No Casualties in California</u>

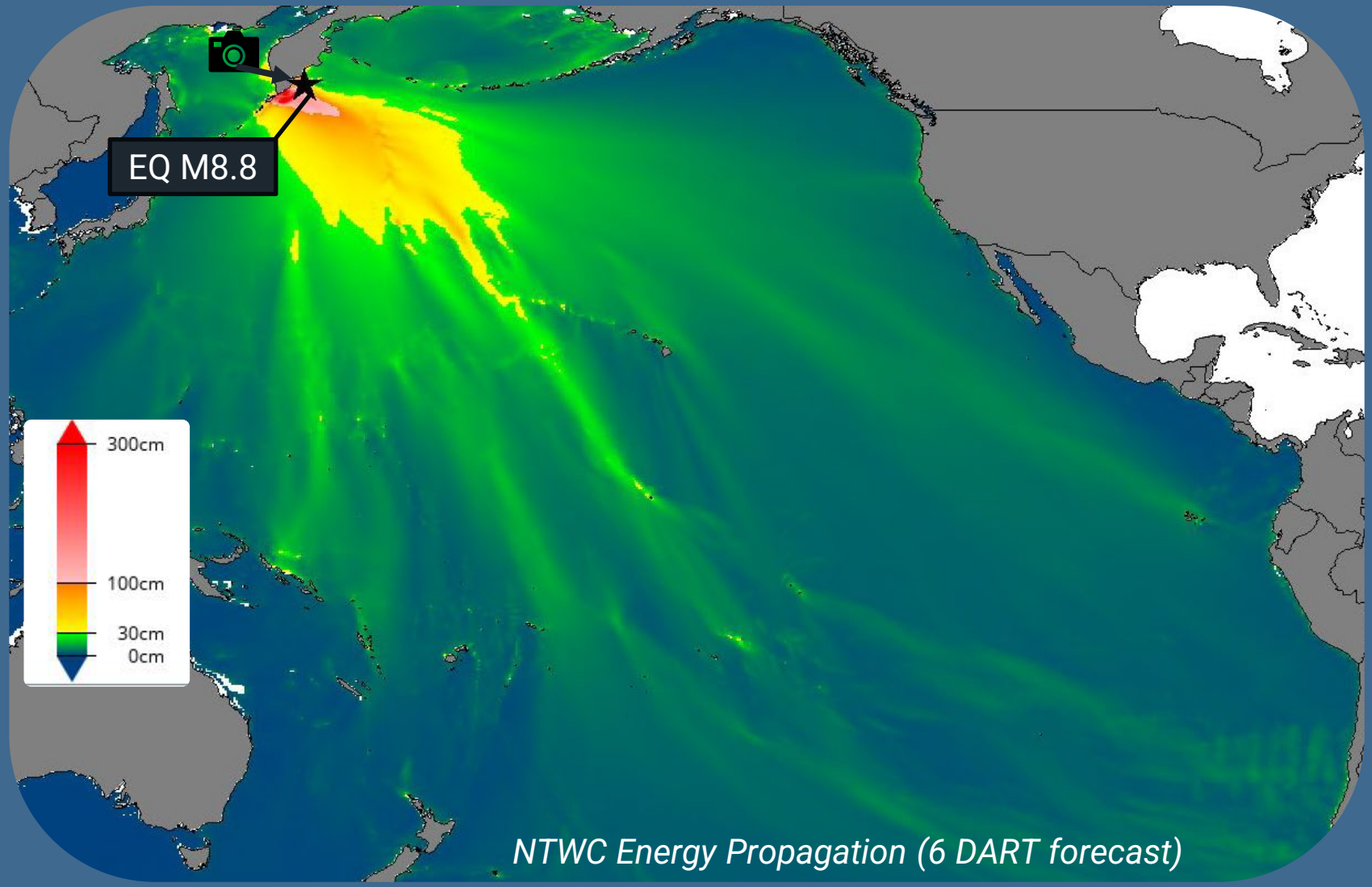
Kamchatka Peninsula Tsunami Energy Map



NTWC Magnitude Estimates

M8.0 -> M8.7 -> M8.8

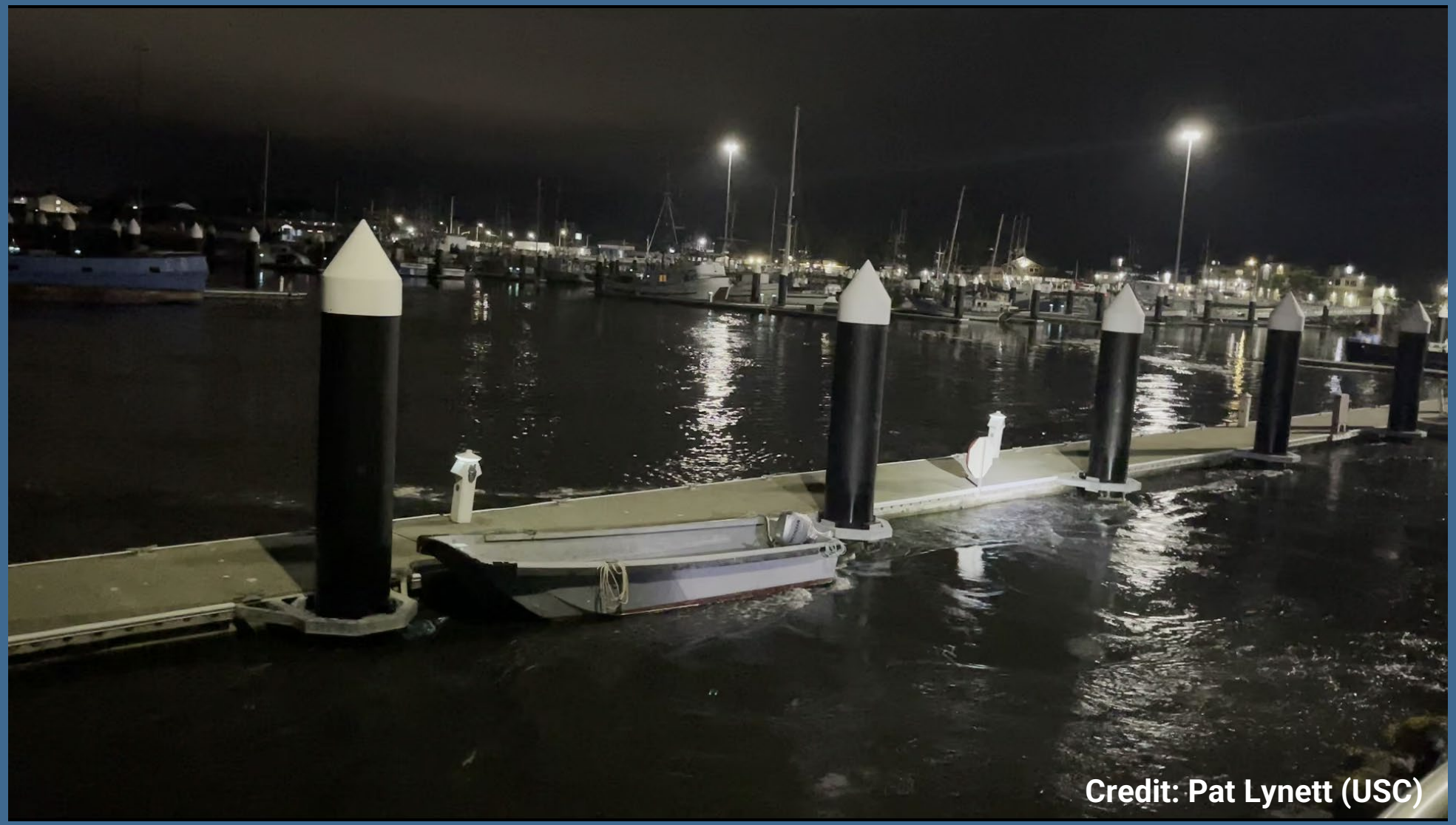
Kamchatka Tsunami July 29, 2025



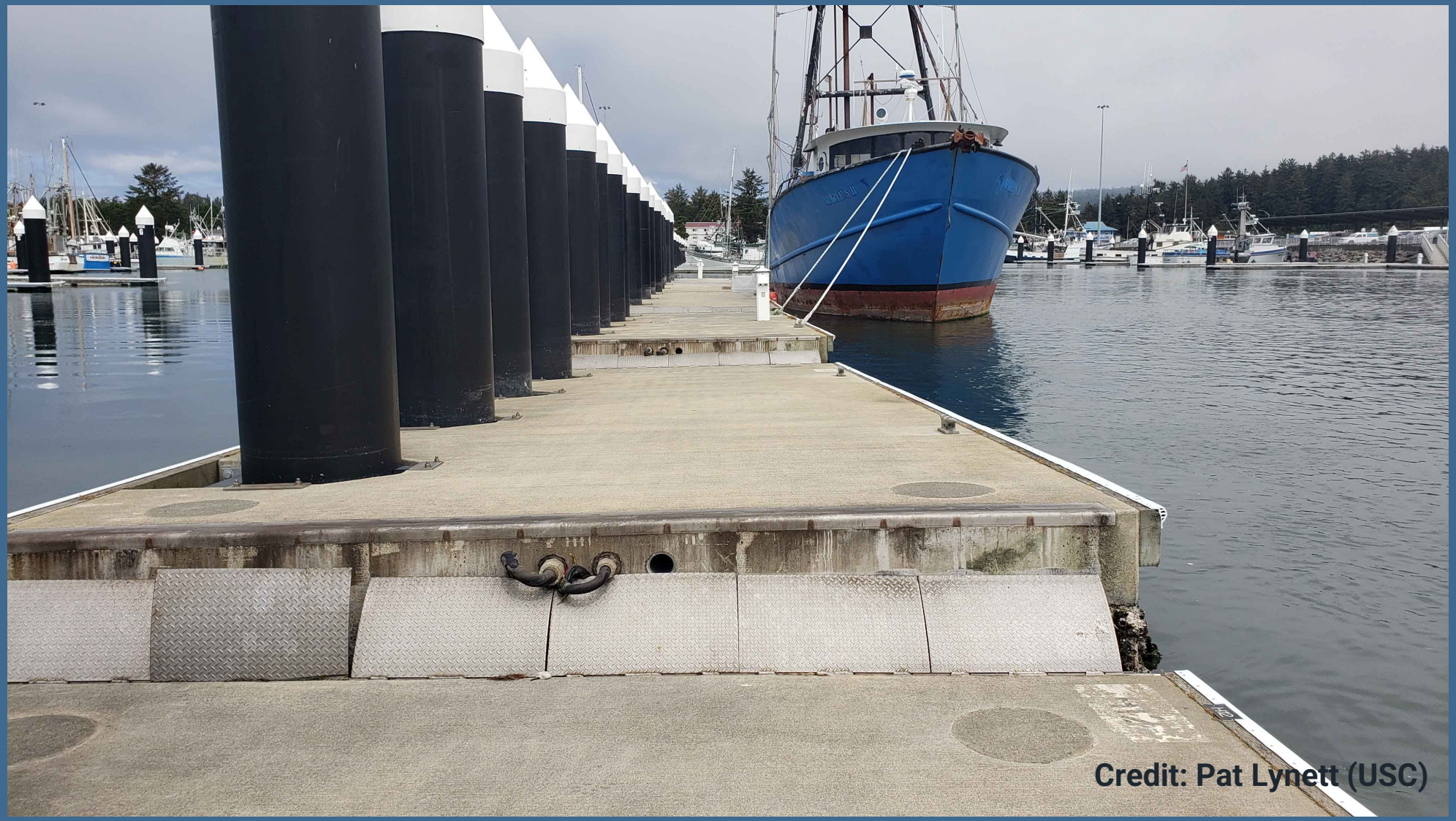
NTWC Energy Propagation (6 DART forecast)

Tsunami in Kamchatka July 29, 2025

Crescent City Harbor: Damage to submerged H-dock



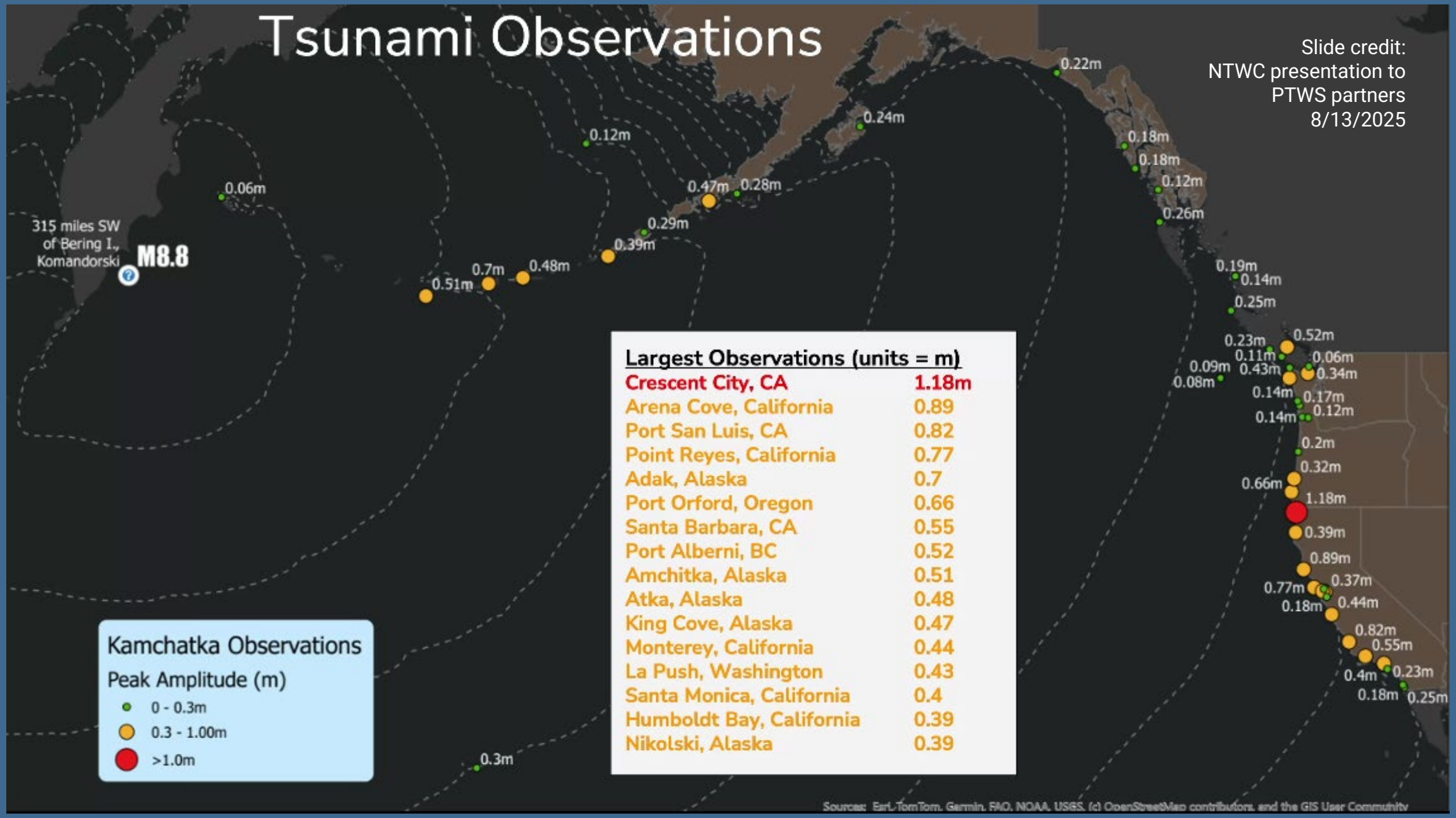
Crescent City Harbor: Damage to submerged H-dock (photo)



Crescent City Harbor: Damage to submerged H-dock (video)

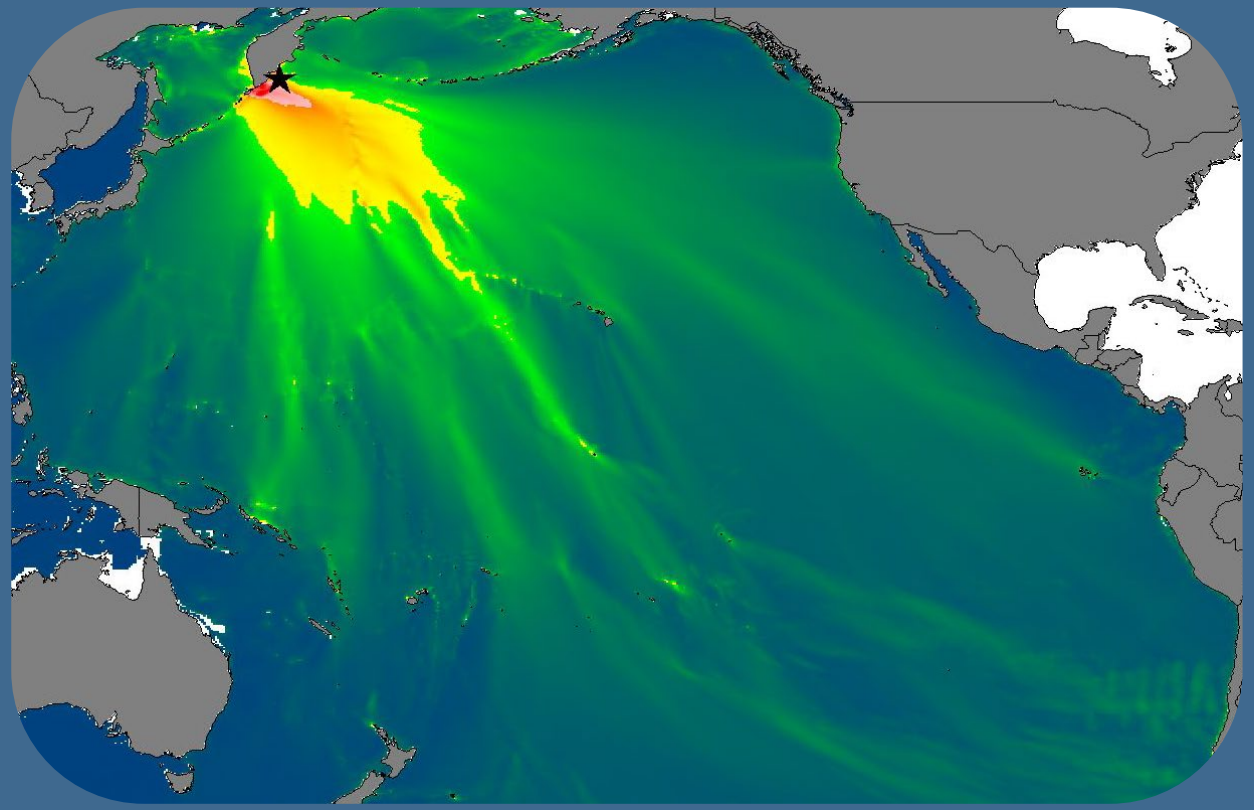
Tsunami Observations

Slide credit:
NTWC presentation to
PTWS partners
8/13/2025



Kamchatka Event Takeaways

- What Went Well
- Lessons Learned

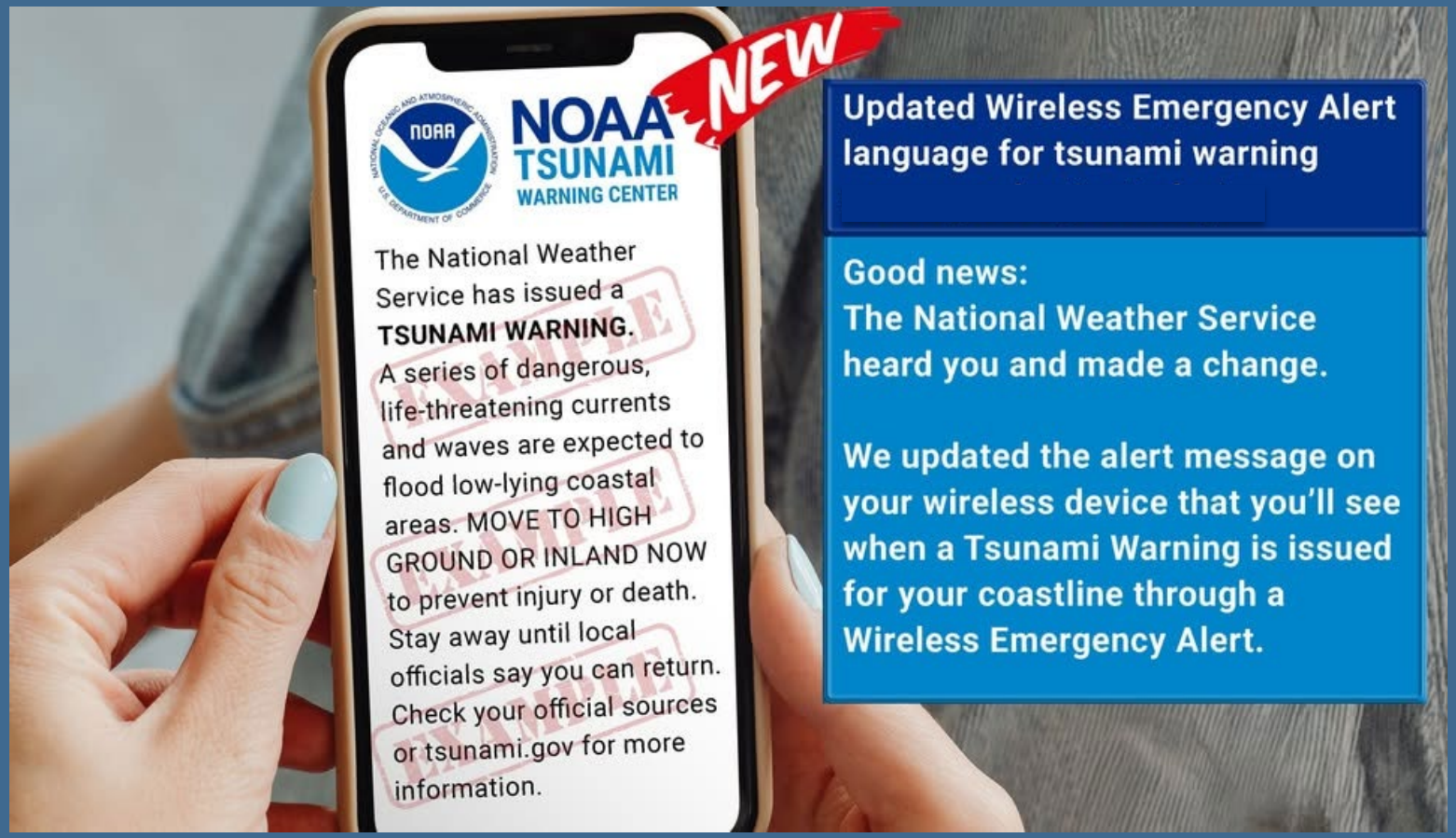


No Casualties!

Tsunami Alerting Improvements

Tsunami Wireless Emergency Alerts (WEA)

- The update is a federal language change implemented by the National Weather Service.
- There are no changes to warning criteria or local response protocols.
- The revised wording is intended to improve clarity and urgency.
- Protective actions remain the same: move inland or to higher ground immediately and follow official instructions.



Rapid Response Events

Phillip J Labra, System Operations Manager

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M4.9 - 20 km NNE of Indio, CA

2026-01-20 01:56:14 (UTC)
33.894°N 116.169°W
3.1 km depth

- January 19, 2026, at 5:56 PM (Pacific Time)
- EEW Alerts
  - MyShake alerted **58,954** devices
  - Google delivered over **470,450** alerts
- Latency: 6.8 seconds (MyShake)
- USGS Felt Report: 8,212 reported

Source: M 4.9 - 20 km NNE of Indio, CA

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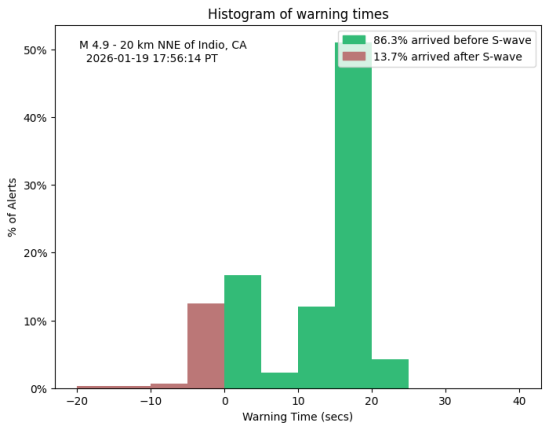
M4.9 - EEW Latency

2026-01-20 01:56:14 (UTC)
33.894°N 116.169°W
3.1 km depth

- ShakeAlert issued the first alert message in 6.5 seconds. It took MyShake 0.3 seconds (total of 6.8 seconds since origin time) to deliver the alert to the first device.



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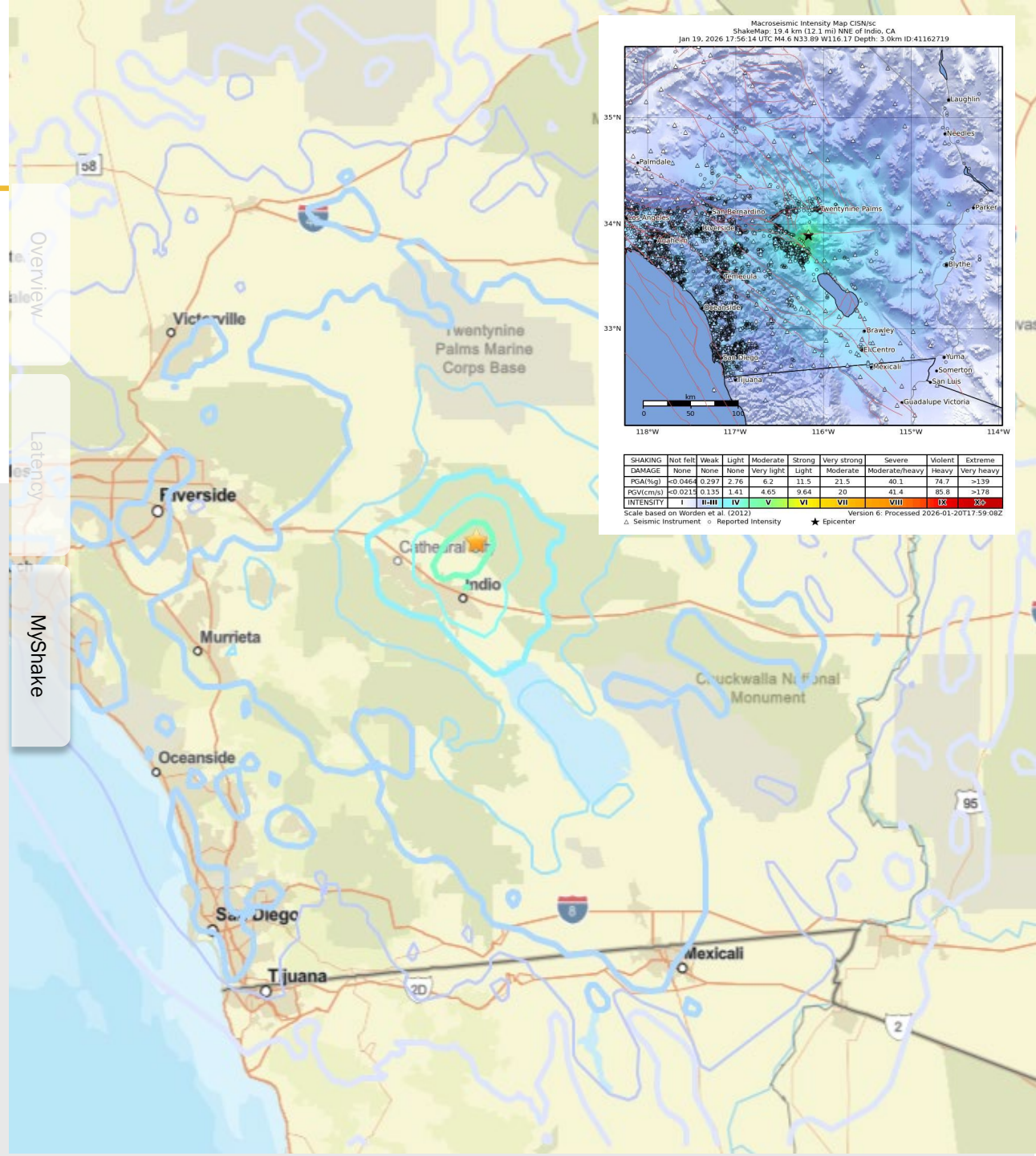
M4.9 – MyShake App Downloads

Date	Number of Downloads (Total)	Download Daily Increase
1/19/2026	4,371,072	8,491
1/20/2026	4,376,314	5,242
1/21/2026	4,378,451	2,137
1/22/2026	4,379,648	1,197
1/23/2026	4,380,328	680
1/24/2026	4,380,903	575
Total Increase Since Event:		18,322

2026-01-20 01:56:14 (UTC)
33.894°N 116.169°W
3.1 km depth



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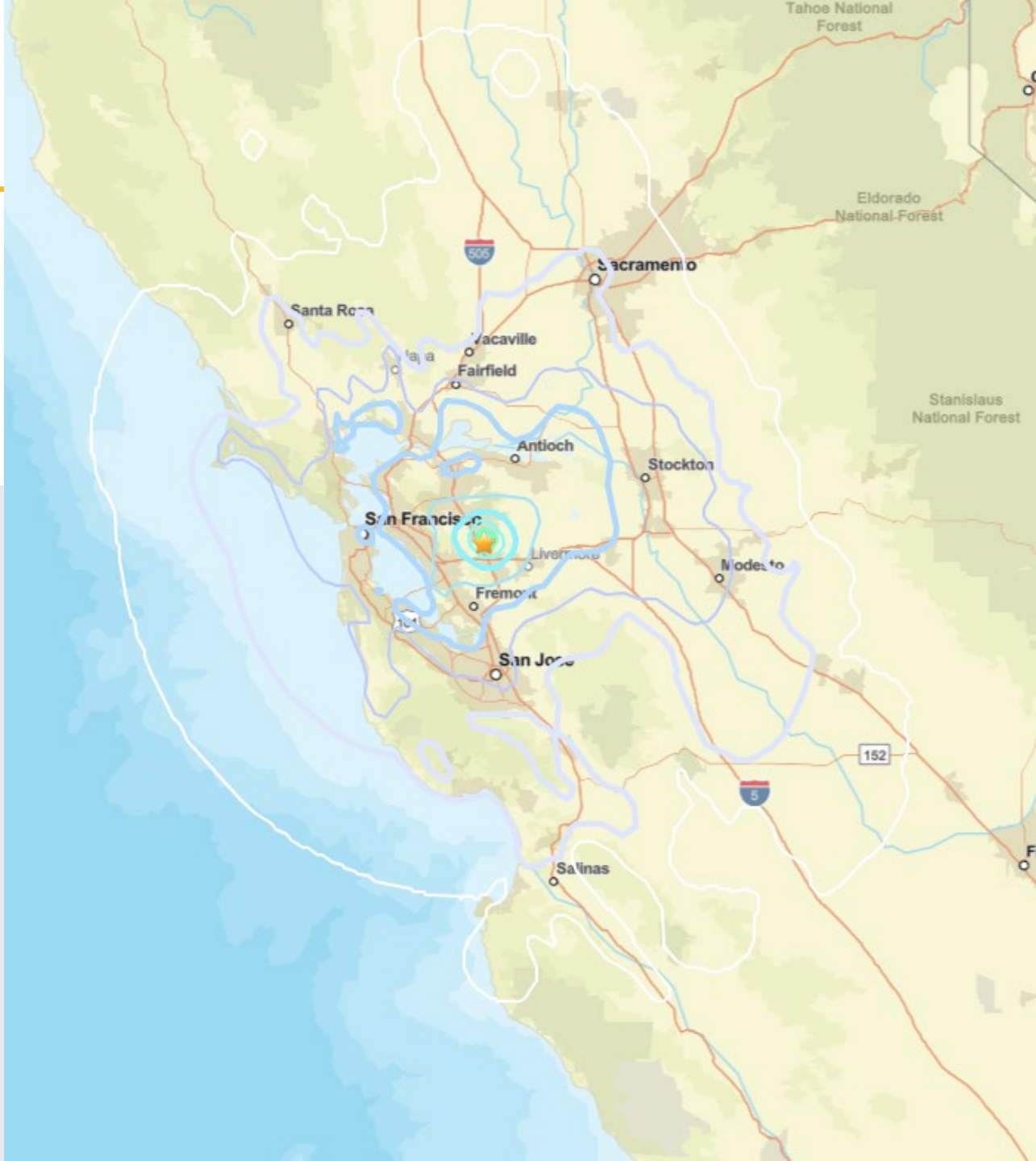
M4.2 - 4 km SE of San Ramon, CA

2026-02-02 15:01:13 (UTC)
37.756°N 121.944°W
9.6 km depth

- February 2, 2026, 7:01 AM (Pacific Time)
- USGS Felt Report: 5,030 reported
- EEW Alerts
  - MyShake did not send alerts
  - Google did not sent alerts

Source: M 4.2 - 4 km SE of San Ramon, CA



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M4.2 – MyShake App Downloads

Date	Number of Downloads (Total)	Download Daily Increase
2/2/2026	4,392,824	5,028
2/3/2026	4,394,335	1,511
2/4/2026	4,395,565	1,230
2/5/2026	4,396,567	1,002
2/6/2026	4,397,303	736
2/7/2026	4,398,060	757
Total Increase Since Event:		10,264

2026-02-02 15:01:13 (UTC)
37.756°N 121.944°W
9.6 km depth

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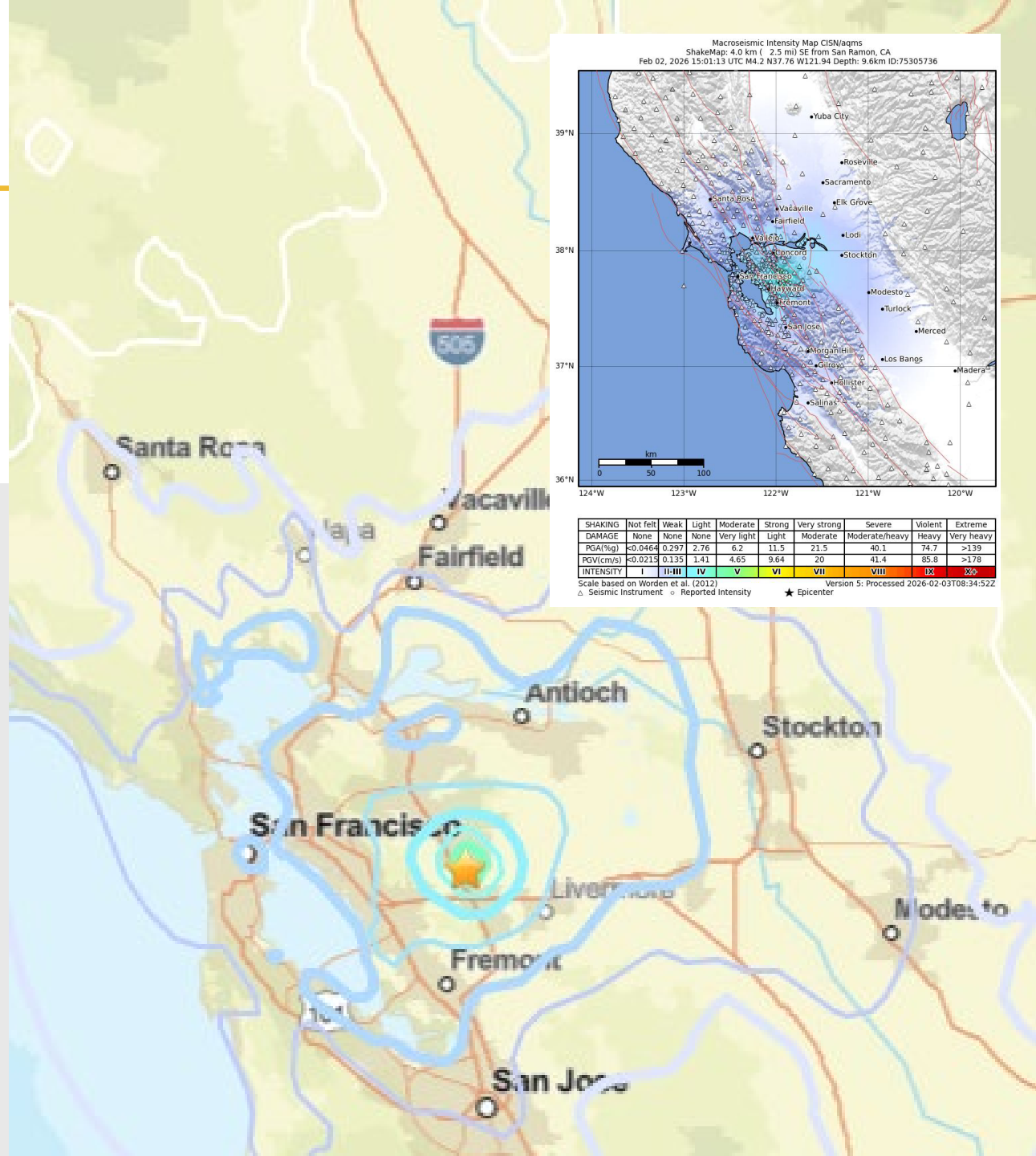

M4.6 - 1 km SE of Boulder Creek, CA

2026-04-02 08:41:25 (UTC)
37.116°N 122.113°W
10.4 km depth

- April 2, 2026, 1:41 AM (Pacific Time)
- EEW Alerts
  - MyShake alerted **401,410** devices
  - Google delivered over **1,281,760** alerts
  - WEAs were issued for ShakeAlert and the Tsunami Warning
- Latency: 7 seconds (MyShake)
- USGS Felt Report: 33,073 reported

Source: M 4.6 - 1 km SE of Boulder Creek, CA

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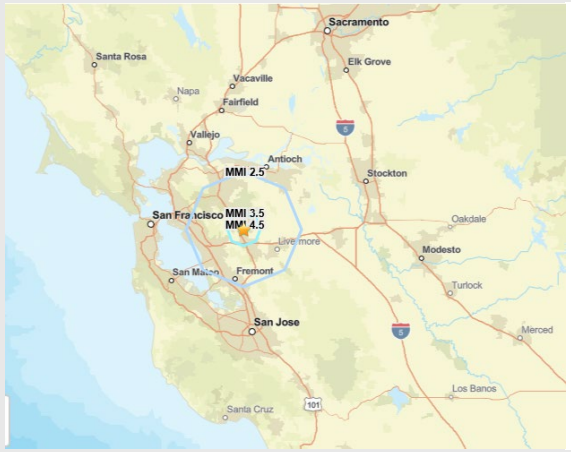
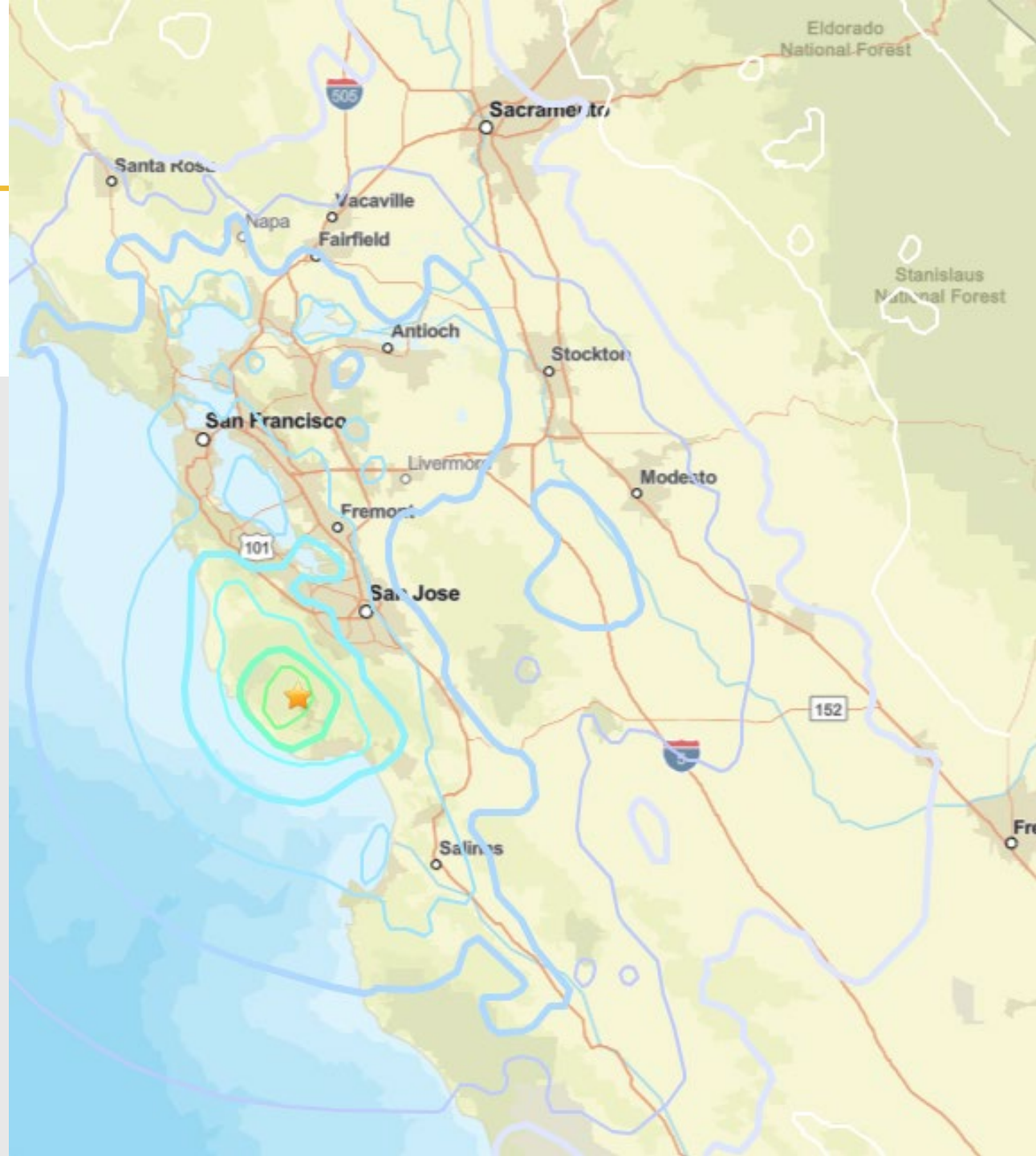
M4.6 - EEW Latency

2026-04-02 08:41:25 (UTC)
37.116°N 122.113°W
10.4 km depth

- ShakeAlert issued the first alert message in 4.9 seconds. It took MyShake 2.1 seconds (total of 7 seconds since origin time) to deliver the alert to the first device.





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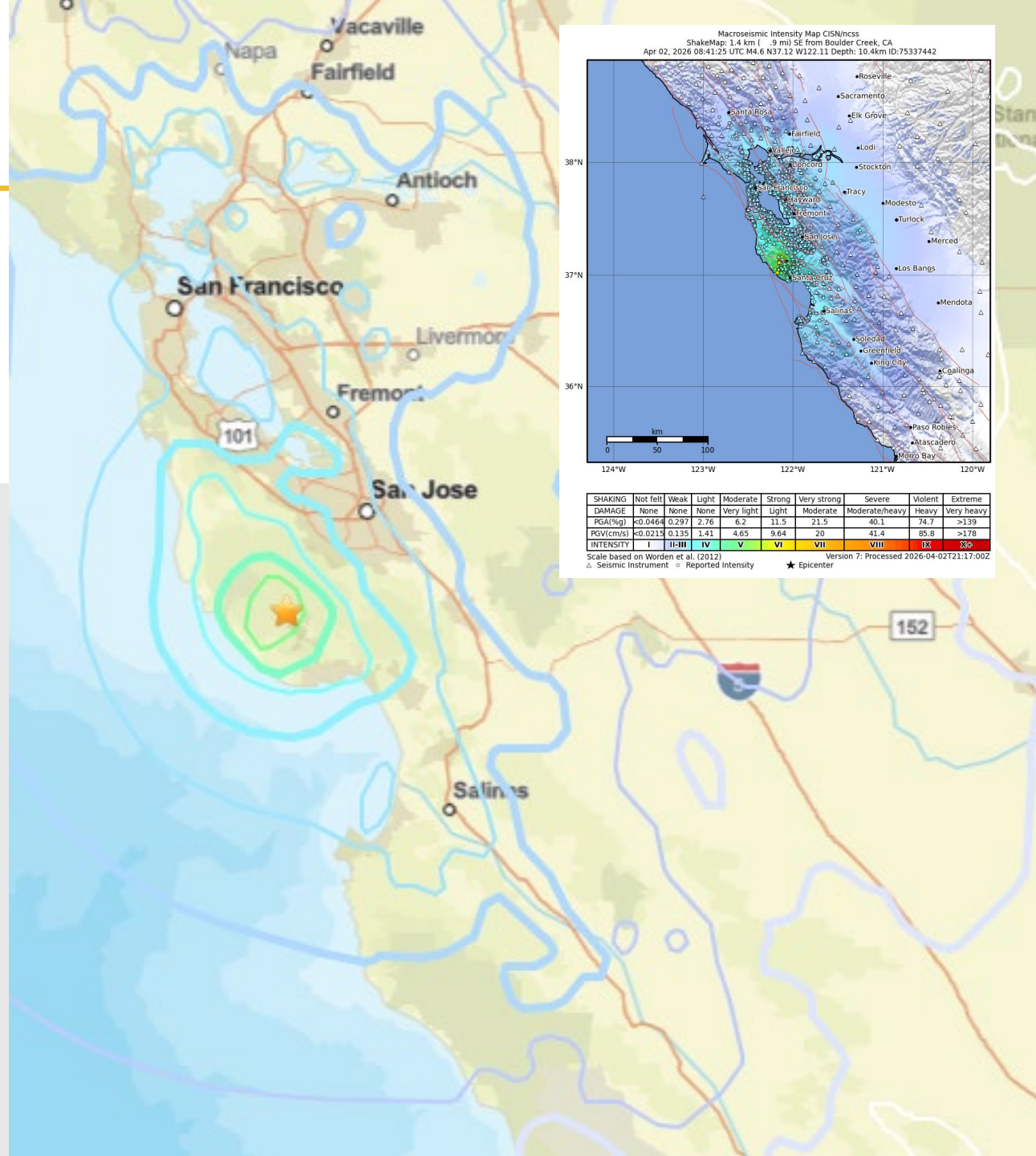
M4.6 – MyShake App Downloads

Date	Number of Downloads (Total)	Download Daily Increase
4/2/2026	4,440,000	13,061
4/3/2026	4,446,006	6,006
4/4/2026	4,447,724	1,718
4/5/2026	4,448,924	1,200
4/6/2026	4,450,106	1,182
4/7/2026	4,450,746	640
Total Increase Since Event:		23,807

2026-04-02 08:41:25 (UTC)
37.116°N 122.113°W
10.4 km depth



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MyShake Updates

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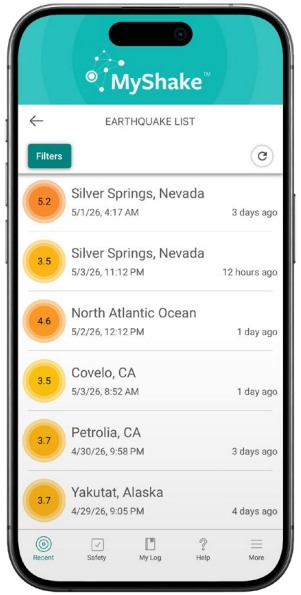
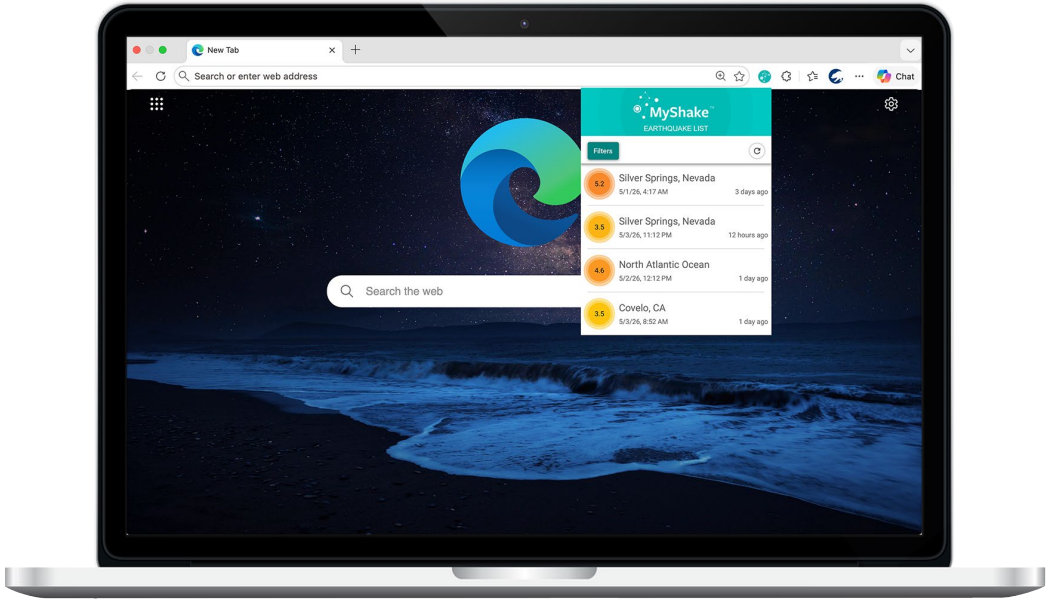
MyShake Extension Deployment Update



Mobile App



Browser Extension

Edge extension deployment

Chrome guidance added

Cal OES & CGS pilot/ positive feedback

Expanded Access

MyShake now supports alerts on work laptops through Microsoft Edge.

Statewide Expansion

Governor's Office OKRs call to expand MyShake deployment to additional state agencies in 2026.

Deployment Toolkit

Cal OES and CGS have used the toolkit approach to support low-lift deployment across managed devices.

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Next Step: Share toolkit with partner agencies for IT review and potential deployment

Discussion

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Education and Outreach

Jon Gudel, Education & Outreach Lead Coordinator

Great CA Shakeout

Jon Gudel, Education & Outreach Lead Coordinator

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2025 Great California ShakeOut Tour

Monday, October 13 – Sacramento Region

- UC Davis

Tuesday, October 14 – San Francisco

- San Francisco Zoo

Wednesday, October 15 – Orange County

- Cal State Fullerton

Thursday, October 16 – San Diego

- San Diego Waterfront

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ShakeOut Tour Metrics

4 Cities + ShakeOut Day

$320K in TV Ad Equivalency

200+ Simulator Experiences

Nearly 35 Media Interviews

190+ Total Media Placements

Over 34,000 MyShake Downloads

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October 16, 2025

Great California ShakeOut Day

Thursday, October 16 at 10:16am

- Drop, Cover, and Hold On
- MyShake App
- Earthquake Safety and Preparedness

Partner Events

- Los Angeles City – EOC
- Oakland City – City Hall

Cal OES Headquarters

- Drill coordination with the California State Warning Center
- Information booths
- Digital outreach
- QuakeHeroes Screening

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2026 Great California ShakeOut Day

Multi City Tour + ShakeOut Day

- Drop/Lock, Cover, and Hold On
- MyShake App
- Earthquake Safety and Preparedness

Cal OES Headquarters

- Earthquake Evacuation Drill
- Social Media Campaign
- Quake Heroes Screening
- Drill coordination with CSWC

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Outreach Events

Jon Gudel, Education & Outreach Lead Coordinator

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Cal OES Outreach Events & Engagements

(2025–2026)

Meta HQ | Menlo Park (December 2025)

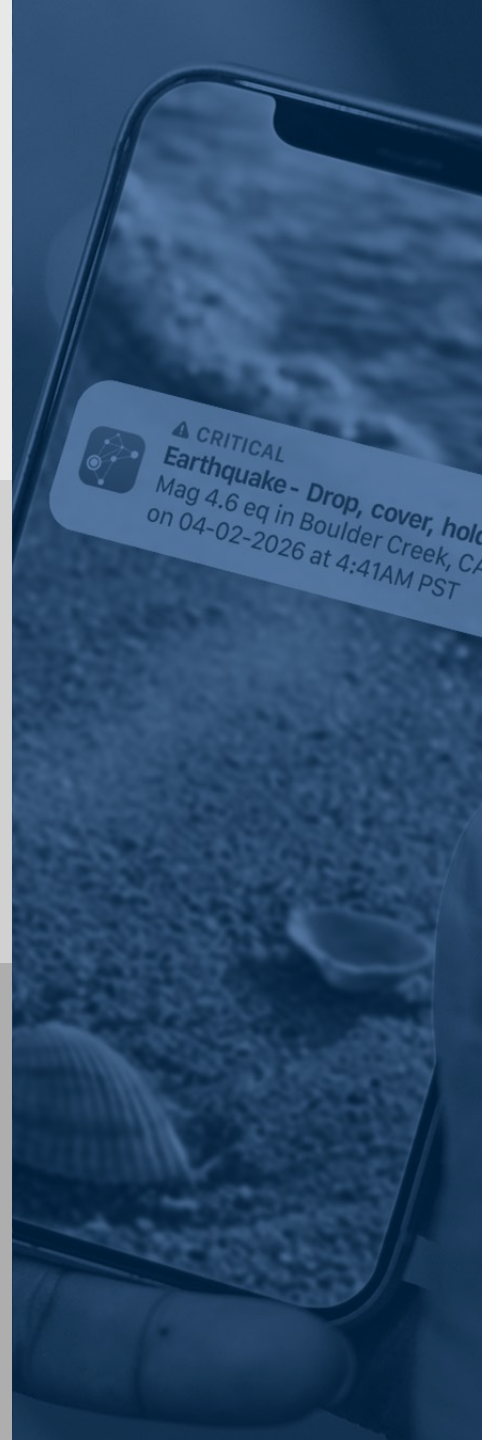
- Explored how MyShake earthquake alerts could reach people directly through Meta platforms like Facebook and Instagram
- Demonstrated how real-time alerts can appear while users are already scrolling, delivering critical safety information in the moment
- Conducted onsite engagement connecting early warning technology with tools people use every day

Disneyland | Anaheim (January 2026)

- Collaborated with Seismic Safety Commission to join National Institute of Building Sciences annual conference.
- Connected with resilience, infrastructure, and building-sector partners
- Used booth materials to promote preparedness and safer-building partners

Sonoma County | Santa Rosa (April 2026)

- Participated in the Wildfire & Earthquake Expo, engaging attendees through hands-on preparedness activities
- Showcased how early warning alerts support individual and community safety
- Connected with residents and partners to promote localized preparedness and resilience



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Discussion

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Research and Development

Brandon Howland, Research & Development Lead Coordinator

Airport Feasibility Study & Grant

Brandon Howland

Research and Development Lead Coordinator

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Introduction

Airports play a role in disaster response and recovery, including emergency relief operations

Earthquakes pose significant risks to airports

EEW Airport Feasibility Study is now live

Our next goal is **implementation** through an $800,000 grant.

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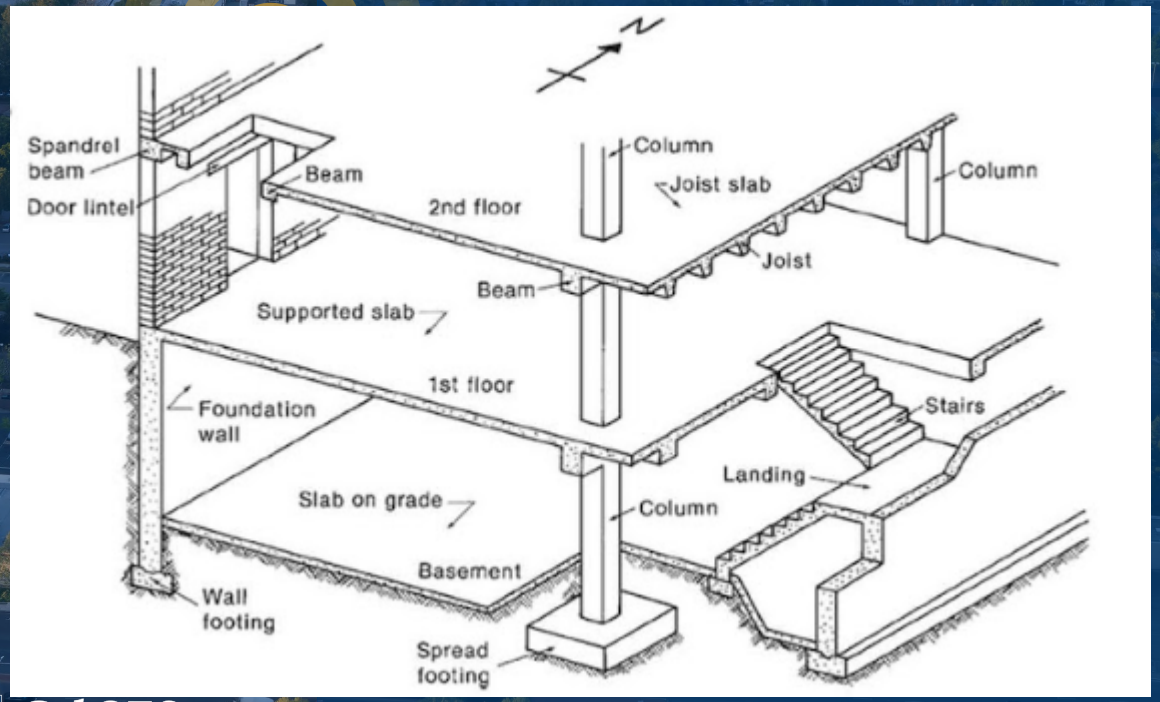
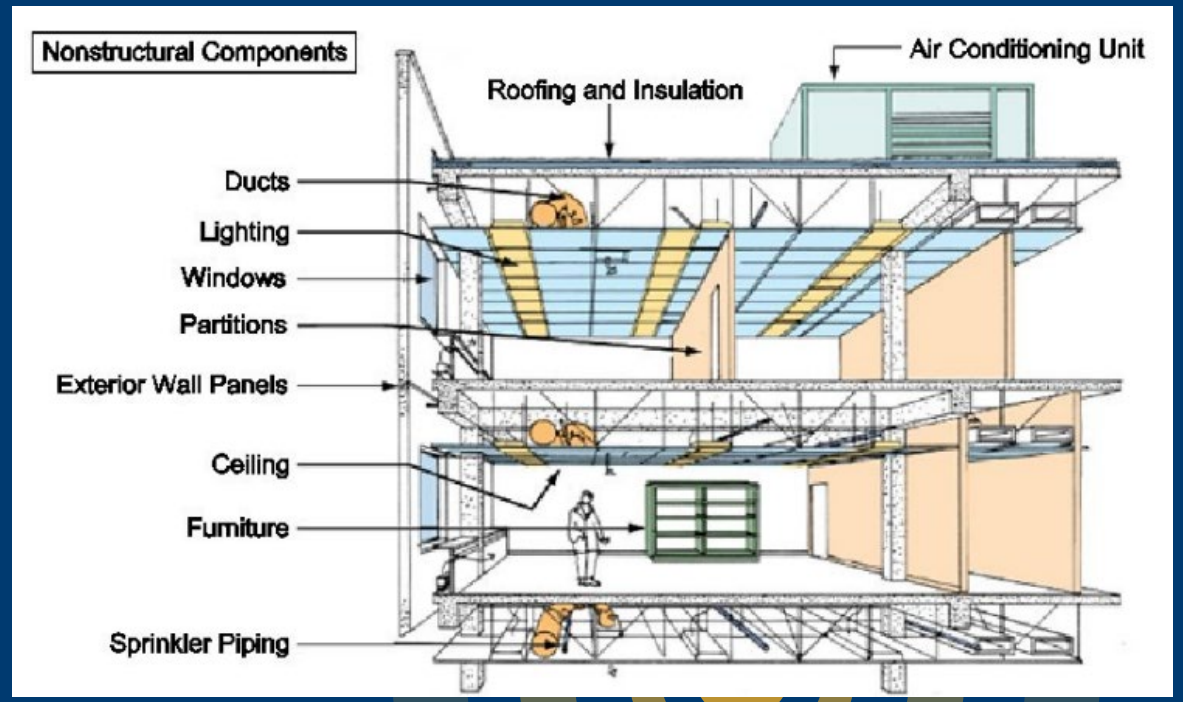
Earthquake Risks to Airports

SEISMIC THREATS TO AIRPORT INFRASTRUCTURE

Structural Damage



Nonstructural Damage



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Earthquake Risks to Airports cont'd.

SEISMIC THREATS TO AIRPORT INFRASTRUCTURE

Liquefaction

Fuel and Pipeline Damage

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Summary of the Benefits and Costs of Different EEW Applications at LAX and PSP

Application	PSP			LAX		
	Benefit ($M)	Cost ($M)	BCR	Benefit ($M)	Cost ($M)	BCR
Smartphone Alert	0.150	0.077	2.0	3.10	0.12	25.8
Gas Shutoff	11.5000	0.123	93.5	3.60	0.21	17.1
Fire Station Bay Doors	0.044	0.068	0.6	1.05	0.07	15.0
Elevator Stop	0.0048	0.13	0.04	0.07	0.29	0.2
Fuel Shutoff	0	0	NA	3.64	0.18	20.2
Water Shutoff	0.009	0.508	0.02	0.12	0.10	1.2
Baggage System Cutoff	NA	0.078	NA	NA	0.27	NA
Backup Power	NA	0.078	NA	NA	0.065	NA

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EEW Airport Implementation Grant

GRANT PROVIDES $800,000 TO TWO RECIPIENTS

JUNE 1, 2026 -> MARCH 31, 2028

AWARDED GRANTEES:

ONTARIO INTERNATIONAL AIRPORT

JOHN WAYNE AIRPORT

Interested Implementation Projects

1. Indoor PA announcements
2. Outdoor PA announcements
3. Fire Station Bay Door Automation
4. Visual Paging System

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Fire Stations

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EEW FIRE STATIONS PILOT PROJECT

- COORDINATING WITH CAL OES FIRE & RESCUE BRANCH & CAL OES GRANTS PROCESSING

- SELECTED FIVE (5) FIRE DEPARTMENTS BASED HAVING TWO OF THE FOLLOWING METHODOLOGY:
  - LOCATED IN A COMMUNITY WITH A CDC SVI OF 0.6 AND ABOVE
  - HOUSES A CAL OES FIRE ASSET
  - HISTORY OF CATASTROPHIC SEISMIC EVENTS

- SELECTED FIRE DEPARTMENTS:
  - LOS ANGELES COUNTY FIRE DEPARTMENT
  - MORONGO RESERVATION FIRE DEPARTMENT
  - SAN BERNADINO COUNTY FIRE DEPARTMENT
  - RIO DELL FIRE PROTECTION DISTRICT
  - ALAMEDA COUNTY FIRE DEPARTMENT

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EEW FIRE STATIONS PILOT PROJECT cont'd.

- TOTAL FUNDING AVAILABLE FOR EACH FIRE DEPARTMENT - $167,000

- THE GRANT COVERED:
  - OUTFITTING FIRE STATIONS WITH EEW EQUIPMENT AND TECHNOLOGY
  - FIVE YEAR OF OPERATIONS AND MAINTENANCE COSTS

- GRANT TIMELINE: JUNE 1, 2024 THROUGH MARCH 31, 2026

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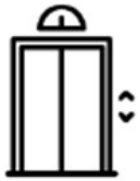
EEW TECHNOLOGY & AUTOMATED ACTIONS

- EEW PROTOCOLS INSTALLED IN FIRE STATIONS MAY REDUCE PROPERTY DAMAGE, QUICKLY RESTORE OPERATIONS, AND FIRST RESPONDER SAFETY.
- EEW TECHNOLOGY COULD, FOR EXAMPLE, REDUCE THE POTENTIAL FOR HAZMAT AND FIRE ISSUES, AS WELL AS IMPROVE COMMUNICATIONS FOLLOWING AN EARTHQUAKE.
- INSTALLED EEW PROTOCOLS CAN OPEN BAY DOORS, AND STOP ELEVATORS, THROTTLE GAS VALVES, PROVIDE COMMUNITY TORNADO-STYLE SIREN ALERTS, SMS TEXT MESSAGES, AND MORE

EEW AUTOMATED ACTIONS

Warning Alarm. EEW alert activates warning alarm to staff, building, and/or facility occupants and visitors, allowing for protective actions such as Drop, Cover, and Hold On and/or avoiding dangerous areas and situations.

Power Supply and Safety. Automated and manual selected power safety power supply shut-off.



Elevators and Escalators. Elevator recall and escalator stop.

Water Control. Automated and manual selected water supply shut-off.

Automatic Adjustment and Shut-Off. Automated adjustment of gas valves (includes shut-off prior to shaking). Gas flow stopped at specific building sites.

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Break

(5 minutes)

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Panel Discussion

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Panel Discussion

Hamid Haddadi, Ph.D., GP
California Geological Survey

Julien Marty, Ph.D.
Berkeley Seismological Laboratory

Allen Husker, Ph.D.
California Institute of Technology

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Discussion

Question 1: Are there any areas of EEW that you would like to see expanded?

Question 2: What do you see as the most critical sector EEW should invest in?

Break

(10 minutes)

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System Operations Update

Cara He, CCST Fellow

CEEWS Network Goal of 1,115 Stations
March 2026 Status

1,065 (+19) stations in CA contributing to ShakeAlert™

50 stations to go!!

EARTHQUAKE WARNING CALIFORNIA

CEEWS System Operations Overview 2016-2026

Sensor Build Out Status

- Completed **700** new and updated EEW/real-time stations, bringing the total contributing to EEW to **1,065 (50 remaining)**
- Connected **173** EEW stations to the existing State Microwave.

	Funded New/Updated EEW Stations	Completed	Remaining
CA Geological Survey	232	232	0
US Geological Survey	162	161	1
UC Berkeley	153	152	1
Caltech	133	133	0
Department of Water Resources (DWR)	22	22	0
Total	702	700	2

	Funded EEW Microwave Connection	Completed	Remaining
Public Safety Communications (PSC)	317	173 (+1)	144 (-1)

Discussion

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Finance

Julie Leo, EEW Ed/O and R&D Coordinator

EEW Budget Update

FY 2025-26 Spending Plan

- Approximately $17.1 million ongoing General Fund
- With dedicated funds for:
  - CEEWS operations and maintenance
  - Continue to deliver EEW and EQ messaging
  - Research and development projects

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Discussion

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Advisory Board Member
Closing Comments

Cal OES
Closing Comments

General Public Comment

Adjournment

EARTHQUAKE WARNING CALIFORNIA

Thank you

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